

# Notice of Allowability

Application No.

10/065,710

Examiner

Dalena Tran

Applicant(s)

KUMAR ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6/9/04.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☒ The drawings filed on 12 November 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

TAN Q. NGUYEN  
PRIMARY EXAMINER

### **EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE**

1. This communication is an Examiner's reasons for allowance in response to application filed on 11/12/02, assigned serial 10/065710 and title "Method and system for temperature estimation of gas turbine combustion cans".

2. The following is the Examiner's statement of reasons for the indication of allowable subject matter:

After carefully reviewing the application in light of the amended claims and the additional search of all the possible areas relevant to the present application, a set of related prior art references has been found, but those prior art references are not deemed strong to make the application unpatentable. Thus, it is found that the application is now in condition for allowance.

Although the references found disclose several claimed limitations, none of the references discloses a method for estimating a temperature profile for individual combustion cans at an inlet of a gas turbine, the method comprising: inputting exhaust temperature profile into a model based estimator of turbine components through which turbine gas flows; wherein model based estimator calculates an estimate inlet temperature profile at the gas turbine inlet, based upon exhaust temperature profile and design parameters of the gas turbine, estimate inlet temperature profile being indicative of the actual firing temperature of each of the individual combustion cans (claim 1); wherein model based estimator applies a set of equations for each stage of the turbine, set of equations relating input temperature, pressure, longitudinal velocity and tangential velocity of the turbine gas to output temperature, pressure, longitudinal velocity and tangential velocity of the turbine gas (claim 3). None of the references found, each stage of the turbine includes a nozzle section and a bucket section, for each nozzle sections of the turbine,

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set of equations include a mass balance equation, an energy balance equation and an isentropic relation equation; for each bucket sections, set of equations include a mass balance equation, a momentum balance equation, and an energy balance equation, and the turbine includes an exhaust diffuser, for exhaust diffuser, set of equations includes a mass balance equation a momentum balance equation, and an energy balance equation; momentum balance equations for bucket sections and exhaust diffuser include angular momentum balance and longitudinal momentum balance (claims 4-5). Also, none of the references found, a method, a system, and a storage medium for estimating a temperature profile for individual combustion cans at an inlet of a gas turbine, the method comprising: normalizing exhaust temperature data to a reference load condition to obtain a normalized exhaust temperature profile; inputting normalized exhaust temperature profile into a model-based estimator of turbine components through which turbine gas flows; wherein model-based estimator calculates an estimated inlet temperature profile at the gas turbine inlet, based upon normalized exhaust temperature profile and design parameters of the gas turbine, estimated inlet temperature profile being indicative of the actual firing temperature of each of the individual combustion cans (claims 6,13, and 20); wherein normalizing exhaust temperature data further comprises obtaining exhaust temperature snapshots from a base load and further obtaining exhaust temperature snapshots from progressively smaller loads down to a part load, wherein data from exhaust temperature snapshots are corrected for mean temperature shift and swirl variation (claims 8, and 15).

Claims 1-20, are allowable over the prior art of record.

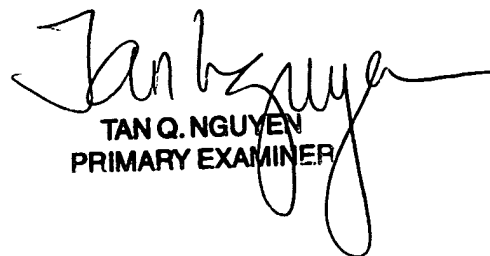
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3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalena Tran whose telephone number is 703-308-8223. The examiner can normally be reached on M-F (7:30 AM-5:30 PM), off every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 703-305-8233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/dt  
August 31, 2004

  
TAN Q. NGUYEN  
PRIMARY EXAMINER